



## THE RHINE. No. VI.



JOHANNESBERG CASTLE.

### JOHANNESBERG, AND THE WINES OF THE RHINE.

COME with me, your faithful friend,  
On the wings of thought along,  
To where the Rhine his course does bend  
Rich vine-covered hills among;  
To his mountains tempest-braving,  
Isles with gayest verdure clad,  
Fields with yellow harvest waving,  
And his woodlands wide outspread.

In former papers, we have taken occasion, in describing portions of the scenery of the Rhine, to speak of the vines which are so largely cultivated upon its banks, and to which the fancy of those who have never seen them assigns a larger share in the formation of its picturesque attractions than they are entitled to. In the minds of most persons the Rhine and the vine are inseparably associated; indeed, the appellation of "Father of Wine," which the Germans have fondly bestowed upon this magnificent river, bespeaks as close a connexion between the two things, as the rhymes of poets have established between the two names.

The wines of the Rhine are chiefly produced along that part of its course which lies between Mentz and Coblenz, and throughout which the river is for the most part confined on both sides by lofty banks, whose light porous soil and rocky substrata furnish the most favourable sites for the cultivation of the grape. The choicest produce is, however, limited, not only to a particular part of this course, but also to one side of it; namely, that fertile and beautiful district of Nassau, which stretches from the Taunus

hills to the northern or right bank of the river, and is known by the name of the Rheingau\*.

Among the wines of the Rheingau, the first place is, by common consent, yielded to those which are produced on the far-famed domain of Johannesberg.

This golden hill, (says the Baron von Gerning,) is the crown of the Rheingau, in the midst of which it is most picturesquely enthroned. In its vicinity, we feel ourselves in the very heart of the far-famed Rhine-land. We ascend imperceptibly this detached vine-hill, which is protected towards the north-east by the wood-covered Rabenkopf, and towards the north by the Taunus mountains. Behind the priory on the same hill, lies the town or village of Johannesberg, formerly a colony of servants belonging to the establishment; and at the foot of the hill facing the river, lies the little village of Johannesgrund, and also a nunnery called the Klaus, connected with the abbey by a subterraneous passage, which was founded in 1109 by Richolf, the last Rhinegrave, in honour of St. George, the then patron of the crusaders. The top of the castle commands a most beautiful view of the Rhine, from Biebrich to Bingen, over the nine islands and the twenty intervening cantons. Slender elms adorn the foot of the golden hill, which was an allodial possession belonging to the archbishopric of Mentz, before the Rheingau came into that see, and before it received the name of Bischoffsberg.

According to the general account, Rhabanus Maurus, previously Abbot of Fulda, first planted this vine-hill, and built a chapel here, dedicated to St. Nicholas; it is also said that he was here elected Archbishop of Mentz in 847. This account, however, rests upon scarcely sufficient authority; it is a fact

\* See *Saturday Magazine*, Vol. XII., p. 105.

better established, that, in the year 1106, Ruthard, Archbishop of Mentz, founded a Benedictine convent upon this hill, and dedicated it to St. John; the convent became enriched with additional endowments until about 1130, under the archbishop Adelbert, it was transformed into a Benedictine abbey.

During the turbulent times of the middle ages, this abbey suffered severely from the calamitous wars to which the country around was constantly exposed; and even in the page of modern history its misfortunes have been recorded. In 1525, during the war of the Boors, it was greatly injured; and seven-and-twenty years afterwards, it was plundered and burnt down by the markgrave, Albert of Brandenburg. It was afterwards restored, but again in 1631 was destroyed by the Swedes, whose dreadful ravages in Germany are still to be traced at the present day. In consequence of these various misfortunes, the establishment became involved in debt, and was abandoned after having been mortgaged for twenty thousand rix-dollars by the archbishop, Elector of Mentz, Anselm Casimir, to Hubert von Bleymaun, treasurer of the empire. The Benedictines soon became very anxious to regain their old possession; but in the mean while the mortgage had risen to thirty thousand rix-dollars, which it surpassed their ability to produce. Fortunately, however, they found a powerful supporter in the Prince Bishop and Abbot of Fulda, who was of the same spiritual fraternity with the monks of Johannesberg; that dignity, after a dexterous negotiation at Mentz, succeeded, in 1616, in recovering their abbey on payment of the mortgage and an additional sum. Instead, however, of being restored to its conventual state, it was converted into a priory.

About the same time, the modern castle or palace was built by the prince bishop; and two of the ecclesiasties belonging to Fulda constantly resided here. Portraits of five bishops are to be seen in one of the apartments; from which also a view is obtained of the mountains of Fulda. Underneath is a cellar, which is said still to exhibit the traces of an attempt made by the French to blow up the edifice in 1796, on account of arrears of contribution,—“An attempt” says Von Gerning, “which would have been realized but for the vigorous interference of the honest bailiff of Rüdesheim, who, on this occasion, spoke his mind in bold German to the plundering general of the hostile forces.” Among other things the bailiff said, “On beholding these ruins the passing traveller will exclaim with execration, ‘This was done by that general.’” The French had emptied the cellars of their wine in the year 1792, when they crossed the Rhine as the bestowers of freedom.

Johannesberg remained in the hands of Fulda until 1802; for three years longer it was possessed by Orange Fulda; and then, in 1805, it passed into the possession of the French, who kept it till the end of the war which liberated Western Germany in 1813.

It was at length, (says Von Gerning,) taken possession of by Austria in 1815; and on the 1st of August, 1816, one hundred years after it came into the hands of Fulda, Prince Metternich, the Oxenstiern of our day, received it as a fief, burdened with an annual duty of the tenth part of the wine produced, by way of reward for his patriotic services.

The situation of Johannesberg is remarkably fine; it has a delightful southern aspect, and commands an extensive and charming view over a fertile and varied tract of country. The hill contains about sixty acres of vineyard; and attached to it are seventy acres of meadow, four hundred and fifty acres of arable land, and four hundred of forest land, the

sovereignty of which belongs to Nassau. The vines consist mostly of *riesslinge*, which impart the particular flavour that characterizes this “German Tokay;” they are small round grapes, sweet and savoury, and of a whitish-yellow colour. The wine itself is described as being “of a gentle heat, mild and strong at the same time, and uniting all the good qualities of the juice of the grape, which are heightened by a late vintage, that generally takes place in the beginning of November, after the grapes have been completely ripened by the frost.”

The *riesslinge* is the plant generally cultivated in the Rhinegau; it requires a warm exposure. In some places an Orleans grape is grown, and produces a wine which is much esteemed for its peculiar flavour and aroma. The vintage is performed in the most careful manner, and at as late a period as the climate and season will permit. For the white wines, which constitute by far the greatest proportion of those made in Germany, the grapes are separated from the stalks and fermented in casks, by which means the aroma is fully preserved. The wine is freed from the lees by successive rackings, and when sufficiently clarified, is introduced into tuns where it is allowed to mellow, and continues to improve during a long term of years. Those used in the Rhinegau commonly hold eight *ohms*, or three hundred and twenty-eight gallons; but in other parts of Germany they are of larger capacity. Formerly the great proprietors vied with each other in the magnitude of the vessels in which they collected and preserved the produce of their vines: and as the better growths are valued in proportion to their age, the stock of wines in the cellars belonging to the princes, magistrates, and richer order of monks, was often enormous. Most persons have heard of the Heidelberg tun\*, and other immense casks in which they have been kept for whole centuries.

At the beginning of this century, (says a native writer,) Germany saw three empty wine casks, from the construction of which no great honour could redound to our country among foreigners. The first is that of Tübingen, the second that of Heidelberg, and the third at Grüningen, near Halberstadt; and their dimensions are not greatly different: the Tübingen cask is in length twenty-four, in depth sixteen feet; that of Heidelberg thirty-one feet in length and twenty-one deep; and that of Grüningen thirty feet long and eighteen deep. These enormous vessels were sufficient to create in foreigners a suspicion of our degeneracy; but to complete the disgrace of Germany, in the year 1725 a fourth was made at Königstein larger than any of the former.

Dr. Henderson remarks, however, that such a mode of preserving certain vintages is not so absurd as some writers have imagined; for the stronger wines are undoubtedly improved by it to a greater degree, than they could have been by an opposite system of management. But in practising this method, it is essential in the first place to keep the vessel always full; and secondly, when any portion of the contents is drawn off, to replace it with wine of the same growth, or as nearly resembling it as possible. When such cannot be had, the vacant space may be filled up by introducing washed pebbles into the cask. The wine which Keyser drank, from a tun which bore the date of 1472, had become thick and acid, because these precautions were neglected. Had it been kept in bottle, this degeneration probably would not have taken place. For the more delicate growths, however, it is said that small vessels are certainly preferable.

The wines of the Rhine, (says Dr. Henderson,) may be regarded as constituting a distinct order by themselves. Some of the lighter sorts, indeed, resemble very much the

\* See Saturday Magazine, Vol. III., p. 140.

*vins de graves*\*; but in general they are drier than the French white wines, and are characterized by a delicate flavour and aroma, called in the country *gäre*, which is quite peculiar to them, and of which it would, therefore, be in vain to attempt the description. A notion prevails that they are naturally acid; and the inferior kinds no doubt are so: but this is not the constant character of the Rhine wines, which in good years have not any perceptible acidity to the taste,—at least not more than is common to them with the growths of warmer regions. But their chief distinction is their extreme durability, in which they are not surpassed by any species of wine.

The Rhine wines often possess the valuable quality of durability when they have little else to recommend them. As they are capable of almost indefinite duration, and as their flavour and aroma are always improved by long keeping, it becomes of essential importance to determine the respective characters of the different vintages for a more extended period than is necessary in the case of most other wines. In favourable seasons the growths of the Rhine are free from acidity, but in bad seasons they contain an excess of what is called malic acid, and are, consequently, liable to the imperfections attendant upon the presence of that ingredient; and as the moisture of a northern Autumn often obliges the grower to gather his grapes before they have attained their full maturity, it is evident that a large proportion of the vintages must be of this description. Hence the wines which have been made in warm and dry years, such as that of 1811, or the year of the comet as it is sometimes called, are always in great demand, and fetch exorbitant prices. Of preceding vintages, those of 1802, 1800, 1783, 1779, 1766, 1748, and 1726, are reckoned among the best, and among them that of 1783 is the most highly esteemed.

Of the Johannesberg wine, the choicest produce is that called Schoss-Johannesberger, which is indebted for its celebrity to its high flavour, and the almost total absence of acidity from it. In former days, when the domain was the property of the Bishop of Fulda, this precious wine was very rare, and it was only by favour that a few bottles of the prime vintages could be obtained from his lordship's cellars. During the changes which occurred in the early part of the present century, a considerable quantity of the wine found its way into the market. A portion of that which grows at the foot of the hill is always to be had; even this is said to be preferable in point of flavour to most of the other Rhine wines, and bears a high price.

Next to the Johannesberger may be ranked the produce of the Steinberg vineyard, which belonged to the suppressed monastery of Eberbach, and is now the property of the Duke of Nassau. It is the strongest of all the Rhine wines, and in favourable years has much sweetness and delicacy of flavour; the vintage of 1811 has been sold on the spot at as high a price as five florins and a half, or half-a-guinea the bottle. The whole quantity made is about 300 hog-heads, of which 60 are of first-rate quality. Some persons, however, dispute the claim of the Steinberg to rank second among the wines of the Rheingau, placing before it the Rüdesheimer wine, which grows on a hill opposite to Bingen, whose acclivity is so steep, that its face has been, to a great extent, formed into terraces, to which the requisite quantity of vegetable mould and manure is carried up in baskets. The Orleans grape is that chiefly cultivated, yielding a wine which combines a high flavour with much body, and is freer from acidity than most of the other growths of the Rhine. This is partly attributed

to the favourable exposure, which allows the grapes to ripen fully, and also to the lateness of the vintage, which seldom commences till the end of October or the beginning of November.

The vineyard of Grafenberg, which formerly belonged, as well as the Steinberg, to the wealthy convent of Eberbach, but is of much less extent than that, is still distinguished for the choiceness of its growths. The produce of Markebrunne, in the same neighbourhood, and that of Rothenberg, near Geisenheim, are highly prized for softness and delicacy of flavour. All these wines are white. The only red wine worthy of notice among the wines of the Rheingau is grown at Asmanshausen, a little below Rüdesheim; in good years it is scarcely inferior to some of the better sorts of Burgundy; but the quantity produced is small, and inferior wines are often substituted under its name. The grapes from which it is made are small, and of a blue colour; Charlemagne is said to have brought the first vines bearing it from Burgundy.

In speaking of the Rhine wines, it is necessary to mention those of Hochheim, which, though obtained from vineyards lying on the banks of the Maine, are usually classed with the Rhine wines, as being of like nature, and nearly of the same excellence. Indeed all the best sorts of the Rhine wines have long been confounded in our country under the general name of Hock, and Rhenish has become the distinguishing term of disrepute for inferior growths. "The Hochheimer," says Dr. Henderson, "is, strictly speaking, a Maine wine; but a corruption of its name has long furnished the appellation by which the first growths of the Rhine are usually designated in this country." *Hock* is a contraction of *Hockamore*, which again is evidently an English corruption of *Hochheimer*.

The little town (says the Author of *An Autumn near the Rhine*), is surrounded by vineyards, with scarcely a tree to obstruct a single ray of sun; but the choice wine of the place, which every alderman flatters himself he drinks, is produced on a little hill of about eight acres, behind the ancient deanery, which seems formed to court the sun, and is protected by the town from the north winds. Each acre contains about 4000 vine-plants, valued at a ducat each; and the little hill produces, in a good year, about twelve large casks of wine, each of which sometimes sells for 1500 florins. (nearly 150*l.*) Hochheim was presented by Buonaparte to General Kellerman.

According to Dr. Henderson there are two vineyards at Hochheim, which yield the first-rate wine; they were both in former times the property of the deans of Mentz. Their united extent does not exceed twenty-five or thirty acres; but the surrounding lands yield an abundant produce, which, as in the case of other wines, often passes for the first-rate. The soils are composed of a white or brown marl, mixed with fine gravel, and reposing in some places on strata of coal, which in hot and dry seasons is said to impart a particular flavour to the wine.

Some of the Rhine wines fetch exorbitant prices, especially those of celebrated vintages. The Baron von Gerning says, that a cask of Johannesberg wine, containing eight *ohms*, or 328 gallons, particularly of the vintage of the "comet year," 1811, often sells for from 3000 to 4000 florins, or from 333*l.* to 444*l.* sterling, which is at the medium rate of nearly 24*s.* per gallon. Among the prices of some of the principal Rhine wines, quoted by Dr. Henderson, are some reaching the amount of 38*s.*, and upwards of 2*l.* per gallon; there are some even running as high as 18*s.* the bottle.

Dr. Henderson observes, that the same causes which have led to the degeneracy of some of the most celebrated French wines, have operated equally on those of the Rhine. The health of the vine, and

\* The *graves* are wines grown upon the gravelly lands to the south-east and south-west of Bordeaux; they are so called from the nature of the soil.



the quality of its fruit, are liable to be affected by a variety of delicate circumstances; a single year of slovenly culture, an injudicious mode of pruning, or the substitution of new plants for old, may ruin the reputation of a vineyard for ever.

For a long time the choicest growths, not only in France but in other countries, were raised on lands belonging to the church; the *vinum theologicum* was justly held to be superior to all other wines. The rich chapters and monasteries were always more studious of the quality than of the quantity of their vintages; their grounds were tilled with the greatest care, and their vines were managed in the most judicious manner; nor did they reject a plant that bore but sparingly, provided there was no falling off in the goodness of the liquor which it supplied. Moreover, in the middle ages, it is well known that the clergy were almost the sole depositaries of learning; and the continued opportunities of observation and study which their retired pursuits afforded them, had probably brought them acquainted, at a very early period, with the best methods of directing the fermentation of the grape and meliorating the produce. When the domains passed into the hands of laymen, the same assiduity and skill were seldom shown in the culture of the vines, or treatment of the vintage; and, in many instances, the old plants, which yielded the most valued wines, were rooted out to make room for others that gave a more abundant supply, but of inferior character.

There is, however, another circumstance to be urged in explanation of the fact, that the choicest wines, in the middle ages, were raised on lands belonging to the church.

The monks (observes a writer in the *Quarterly Review*), were not only, as depositaries of all the learning of the times, themselves most skilled in the culture of the vine, and the manufacture of its juice; but they were also, in every respect, the best landlords, and maintained the happiest dependants. Respect for the church generally saved their land from devastation in feudal broils; there was more security in their cultivation, and they would naturally communicate some of the results of study and experience in rural economy to their vassals.

At no time, however, can the cultivation of the vine on the banks of the Rhine have been attended with much gain and happiness to the labourer. It is true that some countries support a numerous population, but the poverty and misery of the peasantry in them has been long proverbial. Nearly half a century ago, Dr. Cogan spoke of the axiom, "that poverty is most prevalent where the vine is most cultivated," as being well founded. He said that numerous vineyards, such as those on the banks of the Rhine, notwithstanding the picturesque scenes which they presented to the eye, or "the pleasant ideas of luxurious conviviality" which they excited, were, by no means the primary blessings of a country.

Bacchus, whatever joviality he may occasion, has not the benevolence of Ceres; although, by exhilarating the spirits, he may for a season conceal the distress he occasions. Wine is a luxury which cannot furnish either food or raiment to the peasant, and the real necessities of life are always the dearest where this superfluity becomes the chief article of attention and of commerce; they are purchased as *foreign* commodities, and consequently at an advanced price.

It is not the business of virtue to extirpate the affections of the mind, but to regulate them. It may moderate and restrain, but was not designed to banish gladness from the heart of man. Religion contracts the circle of our pleasures, but leaves it wide enough for her votaries to expatiate in. The contemplation of the Divine Being, and the exercise of virtue, are in their own nature so far from excluding all gladness of heart, that they are perpetual sources of it. In a word, the true spirit of religion cheers as well as composes the soul: it banishes indeed all levity of behaviour, all vicious and dissolute mirth, but in exchange, fills the mind with a perpetual serenity, uninterrupted cheerfulness, and an habitual inclination to please others, as well as to be pleased in itself.—ADDISON.

## THE WOOLLEN MANUFACTURE.

### No. III.

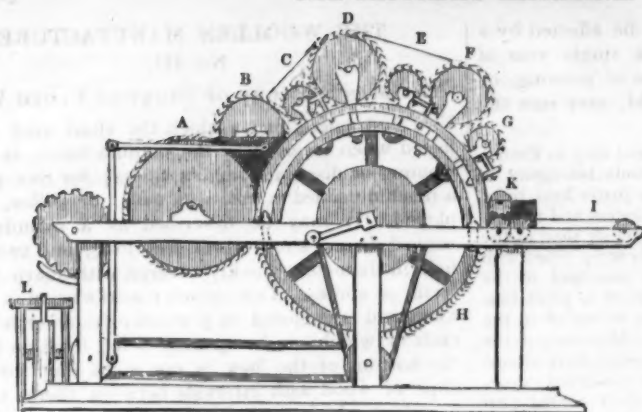
#### THE MANUFACTURE OF SHORT OR CLOTH WOOL.

THE first operation to which the short wool is subjected when received by the manufacturer, is that of opening or disentangling its fibres; for this purpose a machine called a *wool-mill*, *willy*, or *willow*, is employed. It may be described as a cylindrical or conical drum, about three feet long, and two and a half in diameter, thickly covered with sharp pointed teeth, or spikes. This cylinder works upon a strong axis, and is enclosed in a wooden frame or box, two ends of which can be opened, being fixed on hinges; the bottom of the box is not solid, but formed of slips of wood with intervals between them, to allow any dust which may be disengaged in the process to fall through. Over the cylinder, its axis being horizontal, are five smaller rollers or cylinders, also furnished with teeth, and turning on their own axes. The teeth of the rollers and those of the drum, intersect each other during the rotation, as do also the teeth of the rollers themselves. The front door being turned down on its hinges, a quantity of raw wool is laid on it; the door is then closed, and the wool by that means brought within reach of the teeth of the large drum, which carries it upwards so as to work it between its own teeth and those of the smaller cylinders; as the motion is very rapid, the fibres of wool are separated and pulled about in all directions. After being submitted for a certain time to these operations, the door on the other side of the case that encloses the drum is opened, and the wool thrown out by the centrifugal force of the cylinder. The front door is then opened, a fresh supply of wool is introduced and again thrown out, and so on. This process is repeated several times according to the nature of the wool, or the purpose for which it is designed; if the wool is dyed, it undergoes the same operation after the dying.

The *scribbling machine* is next employed; this, in principle and construction resembles the last, but instead of the cylinders being covered with strong teeth like spikes, their surfaces are furnished with *cards* like those used in the manufacture of cotton\*; by means of this machine the fibres of the wool are more equally distributed, and the wool passes through this machine three times. It now is removed to the *carding-engine*.

The carding-engine consists of a number of smaller cylinders, A B C D E F G, covered with *card-cloth*, revolving round a larger cylinder H, covered in the same manner. The large cylinder is about thirty-six inches in diameter, and thirty-two inches in length. I is an endless apron on which the wool is spread equally by hand; this apron is carried slowly onwards towards the two feeding-rollers K, by which it is seized and conveyed to the small cylinder G; from this it is transferred to the large cylinder H. The three largest of the first six small cylinders are called *workers*, and the three smaller, *cleaners*; the wool, in the first instance applied to the large cylinder or drum, is taken off by the first worker, which is in its turn rubbed by the first cleaner, this last returns it to the drum; it is taken up again by the second worker, and again removed by the second cleaner, and so on, until it reaches the cylinder A, called the *stripping-cylinder* or *doffer*, which is much larger and turns slowly. The cards on the doffer do not entirely cover its surface, but are placed on in stripes, fig. 2. The wool falls off the doffer in fleeces about four inches in breadth, and twenty-seven or twenty-eight in length,

\* See *Saturday Magazine*, Vol. V., p. 100.



THE WOOL-CARDING ENGINE.

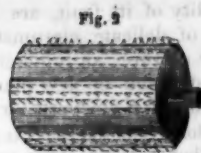


Fig. 2



Fig. 3.

and is received in a cylindrical box L, in the centre of which a fluted cylinder revolves, which gives the fleeces a spiral form, the first element of the thread.

The next operation is performed by the *slubbing-billy*. It reduces the cardings by drawing them out in lengths, joins them in a continuous spongy cord, giving them at the same time a slight twist to prevent their breaking. The wool is now in the state of a soft thread, similar to a *roving* in the cotton manufacture, and is called a *slubbing*; it is now ready to be spun into a thread of a harder texture. The operation of slubbing and spinning in worsted so nearly agree with the same processes in the cotton manufacture, that it would be unnecessary again to enter upon the subject.

When the cloth first comes from the weaver, it is in a very rough unsightly state, and contains a quantity of oil, with which it has become combined during the several processes it has undergone. The next operation is *scouring*, which is performed in the fulling-mill, the cloth being soaked in an alkaline ley, and beaten by machinery; it is then well rinsed with pure water and hung on the tenter-frames to dry. When dry, it is taken down and examined carefully, the knots picked out, and any rents or cuts it may have received, repaired by introducing fresh threads; this is called *burling*. The cloth has now to be thoroughly cleaned in the *fulling-mill*, by means of soap and water.

The next process is *milling*, or *felting*. In the state in which the cloth is received from the *tenter-field*, the naked threads are very perceptible, and the operation of milling is to swell the threads, and *felt* them so as to allow of the cloth afterwards receiving that fine smooth and polished surface, which is the great beauty of fine cloth, and which renders it also more impervious to wet. Commonly, a piece of cloth of sixty-two yards, requires six pounds of soap, which is dissolved in water, and about a handful spread upon each yard in length; the piece is then put into a trough and worked for three hours in the fulling-mill. After twelve hours milling, the cloth is reduced in breadth about two-fifths, and in length one-third; it is now again strained on the tenter-frame, by which it is stretched about one-twentieth, or two yards in forty, but it is very little extended in breadth. The property of felting is only possessed by the short wool, and it is of so singular a nature, that it deserves particular notice.

If an ear of bearded corn is introduced between the wristband and the wrist, the stalk being placed towards the shoulder, the common motions of the arm will cause the ear of corn to move upwards until it reaches the shoulder, and this occurs whether the arm is thrust out of the sleeve or drawn back; this motion takes place by means of the jagged ends

of the grains of corn. The thrusting of the arm outwards would naturally tend to thrust forwards the ear, but the sharp angles of the grain fixing themselves firmly into the shirt-sleeve, maintain the ear in its situation; if the arm is drawn in, the same cause enables the ear to catch hold of the skin and to be drawn upwards, and this is repeated every time the arm is drawn inwards or forced outwards.

Now the construction of the hair of the sheep and the ear of corn is somewhat similar, and the magnified view of three kinds of wool, fig. 3, will show the reason why one sort will felt and the other will not. The long English wool A, it will be seen, is much less notched on its surface than the Saxon B, or the original Spanish C, and therefore resembles less the ear of corn, and will not be acted on in the same manner. The fibres of the cloth made of short wool on being subjected to the operation of fulling, shrink considerably in their length, and close in, as it were, upon each other. The jagged ends of this wool now become entangled, and any attempt to stretch the cloth again to its original length and width would be useless; the more frequently this operation of fulling is repeated, the thicker the texture of the cloth becomes, and it is then said to be *double milled*. We know that if common woollen cloth, when made up into a garment, should get wet, it shrinks considerably, much to the annoyance of the wearer, who, in this manner, has it milled upon his own person. The felting of wool in the manufacture of hat bodies, is effected by acting on the same principles, but the process is more frequently repeated, so as to cause the fibres of the wool to be completely matted together.

After the milled cloth has been properly dried, it has to be *dressed*; this was formerly done by means of the seed-vessels of the fuller's teasle, formed into a kind of hand card, but latterly it has been effected by machinery, and in some cases by means of very fine wire cards. The dressing is the process by which the nap is raised.

The last operation the cloth has to undergo is called *shearing*, or *cropping*; the wool, by the operation of dressing, covers the surface of the cloth like loose fur, which must be removed before it is fit for the market; this was formerly effected by hand with a large pair of shears, but of late years this part of the manufacture has also been performed by the aid of machinery. The cutting instruments resemble the blades of the hand shears, one blade is fixed in an oblique direction, while a revolving cylinder is furnished with several moving blades, which act in succession against the fixed blade, in the same manner as if a pair of shears were worked by hand. The cloth itself is stretched over a metal bed to prevent its lying in creases. The list being thicker than the

rest of the fabric is left unsheared, the blades of the cutters not being of a sufficient width to cut the nap with which it is covered, and as the list is thicker than any other parts of the cloth, grooves are contrived for its reception, and to allow the shears to clip close.

Some of the common woollen cloths are hot-pressed to give them a face, and as this smoothness should only appear on one side, the other is made rough again by means of a sponge and water; this kind of cloth is also dyed after weaving, and the list is sewn on to give it the appearance of having been dyed *ingrain*.

#### ON EMPLOYMENTS WHICH INJURE THE EYE-SIGHT. No. IV.

##### EFFECTS OF THE EXPOSURE OF THE EYE TO ACRID FUMES.

(4.) WE need not offer more than one illustration to this class, inasmuch as others will be readily suggested to the reader's own mind when we state that many fumes, vapours, gases, such as those afforded by ammonia, muriatic acid, &c., so affect the sentient apparatus of the eye as to cause a general irritability which the eye itself tends to remove by exciting a flow of tears. This power, however, is lost in time: inflammation comes as a prelude to disease of a permanent and more lasting character.

The case we have selected is a remarkable one, illustrating the noxious effects resulting from exposure of the person to acrid fumes. A class of persons employed in cleansing the immense sewers of the city of Paris are subject to a disease which is called in one case *la mitte*, in the other case *le plomb*. The former is caused by ammoniacal vapours, and is announced by a smarting in the eyes, and the eye-ball and pupil soon become red, accompanied with other pains, chiefly about the head. Blindness often results, which lasts for a day or two. The patients endure much pain, and get no relief until tears begin to flow. In slight attacks exposure to the open air and shading the eyes is a sufficient remedy: if the attack is strong the men are accustomed to wash their eyes in cold water, to tie a wet bandage over them, and to remain in the dark.

*Le plomb* is also due to gaseous exhalations, chiefly sulphuretted hydrogen and ammoniacal gases, producing convulsions and other alarming symptoms. The danger to these workmen is now entirely removed by the copious use of chlorine in combination with lime or soda, as chlorine possesses the valuable property of entirely destroying and neutralizing these effluvia.

It is perhaps in this place that we may mention a train of effects resulting from narcotics taken inwardly. The effects produced do not certainly come under the denomination of fumes as ordinarily considered; but, be that as it may, the subject is one of much importance, and we do not wish to pass it over unnoticed.

Amaurosis is caused by the use of narcotic substances which have been supposed to act specifically in depressing the energy of the nervous system in general. The symptoms of amaurosis, however, by no means support the opinion that they have a direct sedative operation: the loss of sensibility, as well as the dilatation of the pupil, may be the effect of increased excitement, or a full state of the vessels; for besides considerable external turgescence, sensibility of the pupil almost invariably returns on having recourse to bleeding. The principal substances of this class are *opium* in large doses, *hyoscinus*,

*stramonium*, and *bella donna*. The well-known effect which these substances possess of dilating the pupil when applied to the surface of the eye, or of the neighbouring parts, differs only in degree from what follows their being taken into the stomach; but instead of effecting a loss of power or paralysis of the iris, they seem rather to act as stimuli on the antagonist fibres which compose the greater ring of the iris, and thus overcome its normal or regular obedience to the stimulus of light, analogous to those involuntary and spasmodic actions which they occasion when taken internally. See VETCH on *Diseases of the Eye*. CHRISTISON also in his *Treatise on Poisons*, cites numerous interesting cases of the effect of narcotic poisons on the pupil of the eye.

#### LAVA. MOUNT VESUVIUS.

It was in the month of February (1793) that I went with a party to the source of the lava, for the first time, to ascertain the real state in which the lava proceeded from the volcano that created it. I found the crater in a very active state, throwing out volleys of immense stones, transparent with vitrification, and such showers of ashes involved in thick sulphurous clouds, as rendered any approach to it extremely dangerous. We ascended as near as possible, and then, crossing over to the lava, attempted to coast it up to its source. This we soon found was impossible, for an unfortunate wind blew all the smoke of the lava hot upon us, attended at the same time with such a thick mist of minute ashes from the crater, and such fumes of sulphur, that we were in danger of being suffocated. In this perplexity I proposed immediately crossing the current of liquid lava, to gain the windward side of it, but felt some fears, owing to the very liquid appearance the lava there had so near its source. All my companions were against the scheme, and while we stood deliberating, immense fragments of stone and huge volcanic bombs, that had been cast out by the crater, but which the smoke had prevented us from observing, fell thick about us, and rolled by us with a velocity that would have crushed any of us, had we been in their way. I found we must either leave our present spot, or expect instant death: therefore, covering my face with my hat, I rushed upon the lava, and crossed over safely to the other side, having my boots only a little burnt, and my hands scorched. Not one of my companions, however, would stir; nor could any persuasion of mine avail in getting a single guide over to me. I then saw clearly the whole of the scene, and expected my friends would every moment be sacrificed to their own imprudence and want of courage, as the stones from the crater fell continually around them, and vast rocks of lava bounded by them with great force. At last I had the satisfaction of seeing them retire, leaving me entirely alone. I begged hard for a torch to be thrown over to me, that I might not be lost when the night should come on. It was then that André, one of the cicerones of Resina, after being promised a bribe, ran over to me, and brought with him a bottle of wine and a torch. We had coasted the lava ascending for some time, when looking back I perceived my companions endeavoring to cross the lava lower down, where the stream was narrower. In doing this they found themselves insulated, as it were, and surrounded by two different rivers of liquid fire. They immediately pressed forward, being terribly scorched by the combined heat of both the currents, and ran to the side where I was; in doing which one of the guides fell into the middle of the



red-hot lava, but met with no other injury than having his hands and face burnt, and losing at the same time a bottle of *vin de grave*, which was broken by the fall, and which proved a very unpleasant loss to us, being ready to faint with excessive thirst, fatigue, and heat. Having once more rallied my forces, I proceeded on, and in about half an hour I gained the chasm through which the lava had opened itself a passage out of the mountain. To describe this sight is utterly beyond all human ability. My companions shared in the astonishment it produced; and the sensations they felt, in concert with me, were such as can be obliterated only with our lives. All I had before seen of volcanic phenomena did not lead me to expect such a spectacle as I then beheld. I had seen the vast rivers of lava that descended into the plains below, and carried ruin and devastation with them; but they resembled a vast heap of cinders, or the *scorie* of an iron-foundry, rolling slowly along, and falling with a rattling noise over one another. Here a vast arched chasm presented itself in the side of the mountain, from which rushed, with the velocity of a flood, the clear vivid torrent of lava in perfect fusion, and totally unconnected with any other matter that was not in a state of complete solution, unattended by any *scorie* upon its surface, or gross materials of an insolvent nature, but flowing with the translucency of honey, in regular channels, cut finer than art can imitate, and glowing with all the splendour of the sun.

The eruption from the crater increased with so much violence that we proceeded to make our experiments and observations as speedily as possible. A little above the source of the lava I found a chimney of about four feet in height, from which proceeded smoke, and sometimes stones. I approached and gathered some pure sulphur, which had formed itself upon the edges of the mouth of this chimney, the smell of which was so powerful, that I was forced to hold my breath all the while I remained there. I seized an opportunity to gain a momentary view down this aperture, and perceived nothing but the glare of the red-hot lava that passed beneath it. We then returned to examine the lava at its source. Sir W. Hamilton had conceived that no stones thrown upon a current of lava would make any impression. We were soon convinced of the contrary. Light bodies of five, ten, and fifteen pounds' weight made little or no impression, even at the source; but bodies of sixty, seventy, and eighty pounds, were seen to form a kind of bed upon the surface of the lava, and float away with it. A stone of three hundred weight, that had been thrown out by the crater, and laid near the source of the current of lava, I raised upon one end, and then let it fall upon the liquid lava, when it gradually sunk beneath the surface, and disappeared. If I wished to describe the manner in which it acted upon the lava, it was like a loaf of bread thrown into a bowl of very thick honey, which gradually involves itself in the heavy liquid that surrounds it, and then slowly sinks to the bottom. The lava itself had a glutinous appearance; and although it resisted the most violent impression, seemed as if it might easily be stirred with a common walking-stick. A small distance from its source, as it flows on, it acquires a darker tint upon its surface, is less easily acted upon, and, as the stream gets wider, the surface having lost its state of perfect solution, grows harder and harder, and cracks into innumerable fragments of very porous matter, to which they give the name of *scorie*, and the appearance of which has led many to suppose that it proceeded thus from the mountain itself, being composed

of materials less soluble than the rest of the lava, lighter, and of course liable to float continually on the surface. There is, however, no truth in this. All lava at its first exit from its native volcano flows out in a liquid state, and all equally in fusion. The appearance of the *scorie* is to be attributed only to the action of the external air, and not to any difference in the materials that compose it, since any lava whatever, separated from its channel, at its very source, and exposed to the action of the external air, immediately cracks, becomes porous, and alters its form. As we proceeded downwards this became more and more evident, and the same lava which at its original source flowed in perfect solution, undivided, and free from loose encumbrances of any kind, a little farther down had its surface loaded with *scorie*, in such a manner, that upon its arrival at the bottom of the mountain, the whole current resembled nothing so much as a rolling heap of unconnected cinders from an iron-foundry.

The fury of the crater continuing to increase, menaced us with destruction if we remained any longer in its neighbourhood. A large stone, thrown out to a prodigious height, hung for some time over our heads in the air. Every one gave himself up for lost, until it fell harmless beyond us, shattering itself into a thousand fragments, which rolled into the valley below. We had not left this spot above five minutes before a shower of stones, issuing from the crater, fell thick upon it, covering the source of the lava, and all the parts about it; so that had we waited, as I begged to do, a little longer, every one of us would have been crushed to atoms.

During my second visit the appearances were pretty much the same. I thought the lava flowed slower, and was less in fusion than before, the surface appearing tougher, and being sooner converted into *scorie*. We dressed our beef-steak upon the lava, no fire being better calculated for that purpose, owing to the excessive heat it gives.

Upon my third visit I found the lava had taken a different course, and flowed towards the Torre del Annonciato, whereas it had before proceeded in a channel exactly opposite the cross. The source itself had undergone great alterations, and bore strongly the marks of an earthquake.—BISHOP OTTER'S *Life of Clarke*.

THERE is inconsistency and something of the child's propensities still in mankind. A piece of mechanism, as a watch, a barometer, or a dial, will fix his attention. A man will make journeys to see an engine stamp a coin or turn a block; yet the organs through which he has a thousand sources of enjoyment, and which are in themselves more exquisite in design, and more curious both in contrivance and in mechanism, do not enter his thoughts; and if he admire a living action, that admiration will probably be more excited by what is uncommon and monstrous, than by what is natural and perfectly adjusted to its office,—by the elephant's trunk than by the human hand. This does not arise from an unwillingness to contemplate the superiority or dignity of our own nature, nor from an incapacity of admiring the adaptation of parts. It is the effect of habit. The human hand is so beautifully formed, it has so fine a sensibility, that sensibility governs its motions so correctly, every effort of the will is answered so instantly, as if the hand itself were the seat of that will. Its actions are so powerful, so free, and yet so delicate, that it seems to possess a quality of instinct in itself, and there is no thought of its complexity as an instrument, or of the relations which make it subservient to the mind: we use it as we draw our breath, unconsciously, and have lost all recollection of the feeble and ill-directed efforts of its first exercise by which it has been perfected. Is it not then the very perfection of the instrument which makes us insensible to its use?—BELL.

### THE CICADA, AND ITS ORGANS OF VOICE.

THE Cicadæ are insects belonging to the order called *Hemiptera*, (half-winged,) on account of the wings partaking generally of a double character, being partly of a leathery substance and partly transparent; in the Cicadæ, however, this distinction is not so apparent. The Cicadæ are found in abundance in most of the warmer parts of the globe; there are also several species, natives of more temperate regions. These insects are noted for the singular noise they produce, and on this account they were in great favour among the ancient Greeks. They were kept in cages for the sake of their song, and were a favourite image of innocence and cheerfulness with the poets of Greece. One bard intreats the shepherds to spare the innoxious *Tettix*, (the Greek name for the Cicada,) that nightingale of the Nymphs, and to make those mischievous birds, the thrush and blackbird, their prey.

Sweet prophet of the Summer, (says Anacreon, addressing this insect,) the Muses love thee; Phœbus himself loves thee, and has given thee a shrill song; old age does not wear thee out; thou art wise, earthborn, musical, impassive, without blood.

The sound produced by the Grecian Cicada must necessarily have been musical; it was called by the same name as the music of the harp.

A Cicada, sitting upon a harp, was a usual emblem of the science of music, which was thus accounted for:—When two rival musicians, Eunomus and Ariston, were contending upon that instrument, a Cicada, flying to the former, and sitting on his harp, supplied the place of a broken string, and so secured him the victory.

The Cicadæ of modern times are equally famous for the power, if not for the musical property of their voice. Dr. Shaw, in his *Travels*, says,—

In the hotter months of Summer, especially from mid-day to the middle of the afternoon, the Cicada is perpetually stunning our ears with its most excessively shrill and ungrateful noise. It is, in this respect, the most troublesome and impertinent of insects, perching upon a twig, and squalling sometimes two or three hours without ceasing, thereby too often disturbing the studies or short repose, which is frequently indulged in in these hot climates for a few hours.

The Brazilian Cicadæ are said to sing so loud, that they can be heard at the distance of a mile. On account of the sound this insect produces, it is called in the United States, the American Locust.

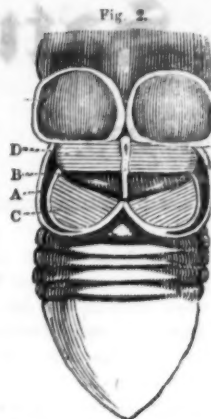
The apparatus by which the male Cicada produces the sound for which it is famous, is thus described in Kirby and Spence's beautiful work on Entomology.

If you look at the underside of the body of a male, the first thing that will strike you is a pair of large plates, of an irregular form, *b*; in some semi-oval, in others triangular, in others again a segment of a circle of greater or less diameter, covering the anterior part of the belly; these are the drum-covers, or opercula, from beneath which the sound issues, at the back of the posterior legs. Just above each operculum there is a small pointed triangular process, (*persillum*), *a*, the object of which, as Réaumur supposes, is to prevent them from being too much elevated. When an operculum is removed, beneath it you will find, on the exterior side, a hollow cavity, with a mouth somewhat linear, (like a slit, the width of a line,) *fig. 2, A*, which seems to open into the interior of the abdomen. Next to this, on the inner side, is another large cavity, *n*, of an irregular shape, the bottom of which is divided into three portions: of these the posterior is lined obliquely with a beautiful membrane, which is very tense, *c*; in some species semi-opaque, and

in others transparent, and reflects all the colours of the rainbow; this mirror is not the real organ of sound, but is supposed to modulate it. The middle portion is occupied by a plate, of a horny substance, placed horizontally, and forming the bottom of the cavity *n*. On its inner side this plate terminates in a crania, or elevated ridge, common to both drums. Between the plate and the after-breach, (*post pectus*), another membrane, folded transversely, fills an oblique, oblong, or semilunar cavity. In some species I have seen this membrane in tension, probably the insect can stretch or relax it at pleasure, but even all this apparatus is insufficient to produce the sound of these animals. One, still more important and curious, still remains still to be described. This organ can only be discovered by dissection. A portion of the first and second segments being removed from that side of the back of the abdomen which answers to the drums, two bundles of muscles, *fig. 3, B*, meeting each other in an acute angle, attached to a place opposite to the point of the *muero* (a pointed prominence, like a sharp tooth,) of the first ventral segment of the abdomen will appear. These bundles consist of a prodigious number of muscular fibres, applied to each other, but easily separable. Whilst Réaumur was examining one of these, pulling it from its place with a pin, he let it go again, and immediately, though the animal had been long dead, the usual sound was emitted.

If these creatures are unable themselves to modulate their sounds, here are parts enough to do it for them, for the mirrors, the membranes, and the central portions with their the cavities, all assist in it. If you remove the lateral part of the first dorsal segment of the abdomen, you will discover

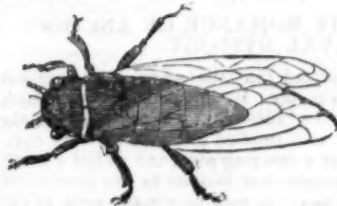
a semi-opaque, and nearly semicircular concave-convex membrane, with transverse folds, *fig. 3, A*; this is the drum. Each bundle of muscles before mentioned, is terminated by a tendinous plate, nearly circular, from which issue several little tendons that, forming a thread, pass through an aperture in the horny piece that support the drum, and are attached to its under or concave surface. Thus the bundle of muscles, being alternately and briskly relaxed and contracted, will by its play, draw in and let out the drum, so that its convex surface being thus rendered concave when pulled in, when let out, a sound will be produced by the effort to recover its convexity, which sound striking upon the mirror and the other membrane, before it escapes from under the operculum, will be modulated and augmented by them. I should imagine that the muscular fibres are extended and contracted by the alternate approach and recession of the trunk and the abdomen to and from each other.



Under View, with the Drum-covers turned back.



Back View; several Portions of the Skin removed to show the Drum and its Muscles.



THE CICADA.



The Drum of the Cicada, and the Muscles by which it is moved.

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